

1 IN THE UNITED STATES DISTRICT COURT
2 FOR THE NORTHERN DISTRICT OF OKLAHOMA

3 STATE OF OKLAHOMA, ex rel,)
4 W.A. DREW EDMONDSON, in his)
capacity as ATTORNEY GENERAL)
5 OF THE STATE OF OKLAHOMA,)
et al.)

6 Plaintiffs,)

7 V.)

No. 05-CV-329-GKF-SAJ

8)
9 TYSON FOODS, INC., et al.,)

10 Defendants.)

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13 REPORTER'S TRANSCRIPT OF PROCEEDINGS

14 MARCH 3, 2008

15 PRELIMINARY INJUNCTION HEARING

16 VOLUME V

17
18 BEFORE THE HONORABLE GREGORY K. FRIZZELL, Judge

19
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Exhibit 54

Glen R. Dorrough
UNITED STATES COURT REPORTER

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WITNESS CALLED ON BEHALF OF PLAINTIFFS:

ROBERT SWAN LAWRENCE

Direct Examination by Mr. Edmondson..... 1162

1 water, air, odor, so there are social impacts for community
2 members. This is not as great a problem for the Illinois River
3 Watershed, but there are many parts of the country now where
4 downwind of concentrated animal feeding operations, the air
5 quality from the point of view of contaminants in the air as
6 well as from the problem of intense odor has become widespread.

7 Q. And from where does that odor come?

8 A. Well, the odor is part --

9 MR. RYAN: Your Honor, I object. He said it doesn't
10 apply to the IRW.

11 THE COURT: Sustained. We've all been to the
12 panhandle, I believe. Go ahead.

13 THE WITNESS: Shall I answer it?

14 THE COURT: No, the objection is sustained. Go ahead.

15 Q. (By Mr. Edmondson) I'll rephrase the question. Is there
16 bacteria in the litter of the poultry waste?

17 A. There are bacteria. There are other compounds, breakdown
18 products of urine and feces, ammonia, hydrogen sulfide, nitrous
19 oxide. It depends a little bit on the mix of what animal we're
20 talking about as well as what kind of bedding or other organic
21 material has been mixed in with the waste.

22 Q. Specific as to poultry waste, is there bacteria associated
23 with poultry waste?

24 A. Yes.

25 Q. What nature of bacteria is associated with poultry waste?

1 A. Well, there are a broad range of organisms that have been
2 isolated from poultry waste. Salmonella and Campylobacter
3 species are among the more important human pathogens. E. coli,
4 Enterococci, there are species of Coccidioides that is not
5 infectious for humans, but is an important problem for growth
6 of the bird. So Arsenicals, Roxarsone and other organic
7 arsenic materials, are added to the poultry feed in order to
8 reduce the Coccidioides to enhance the growth of the bird.
9 There's also a Giardia species, again it's not the species that
10 happens to affect the humans, but it's present in poultry
11 waste.

12 Q. Don't most of these bacteria die at some point in time?

13 A. Eventually, but many of them can live for three or four
14 months after being deposited by the bird.

15 Q. What factors determine the length of viability of these
16 bacteria?

17 MR. RYAN: Your Honor, there's been no foundation for
18 this question of this witness. I object.

19 THE COURT: Sustained.

20 Q. (By Mr. Edmondson) Are you able to state from the
21 materials you reviewed or from your own knowledge and expertise
22 whether these problems are present in the Illinois River
23 Watershed?

24 A. Yes, from what I have read, the story is very remarkably
25 similar to what I've directly observed on the eastern shore of

1 Enterococci and E. coli when using the geometric mean. And
2 then in the right-hand part of the chart, there are a number of
3 places where the single point estimates again show exceedances.
4 Some of them are three times over the standard. One of them is
5 14 times over the standard, five over the standard. These all
6 indicate significant bacterial contamination of the Illinois
7 River Watershed.

8 Q. And in your opinion, do these exceedances have
9 ramifications as to human health?

10 A. They have important ramifications. Based on the
11 epidemiologic data we've been talking about, I would expect
12 there to have been a significant number of people coming down
13 with gastrointestinal disease as a result of exposure to
14 recreational use of these waters.

15 Q. How would gastrointestinal disease manifest?

16 A. Well, the incubation time for the common forms,
17 Salmonella, Campylobacter, vary a little bit. But usually
18 three to seven or eight days after exposure to the source of
19 bacteria, a person would develop fever, nausea, vomiting,
20 diarrhea. And in a small subset of that population, they might
21 go on to much more serious illness including bloody diarrhea.
22 And in the case of enteropathogenic E. coli, they might develop
23 what is called the hemolytic uremic syndrome which can actually
24 cause death.

25 Q. Dr. Lawrence, let me invite your attention first to

1 you received from Plaintiffs' experts and affidavits?

2 A. Yes, they do.

3 Q. Dr. Lawrence, the data that you've just reviewed and the
4 exceedances you've just described, what import, if any, do they
5 have for people who use the Illinois River Watershed?

6 A. Well, I would hope that people would be informed of the
7 considerable risk that they are undertaking by exposing
8 themselves to waters that contain these levels of indicator
9 bacteria for human pathogens. I think it represents a real and
10 present danger to the health of the public, people who are
11 exposed to these waters, and I would be highly motivated as a
12 public health person to do whatever I could to reduce the risk.

13 Q. Now, there's an affidavit you reviewed from Dr. Banner?

14 A. Yes.

15 Q. He suggested that the risks that the State describes are
16 not valid. Do you have an opinion as to Dr. Banner's opinion?

17 A. Dr. Banner appears to base his opinion on -- I haven't
18 seen cases of diarrheal disease coming from the Illinois River
19 Watershed. And I would say that that is probably the weakest
20 kind of scientific evidence you could have, knowing what we do
21 about the pathophysiology of these diseases, knowing about the
22 problems associated with passive surveillance, which is how we
23 rely on reporting cases to the state health department and to
24 the CDC. And that based on the soundness of the EPA's
25 epidemiologic data, we can only say that he must be missing a

1 lot of cases. People either are self medicating or they are
2 attributing their diarrheal disease to the egg salad sandwich
3 they ate yesterday rather than swimming in the Illinois River
4 five days ago.

5 Q. Does everyone who gets gastroenteritis go to a doctor and
6 get a lab test?

7 A. No, a very, very small proportion. Most people self
8 medicate.

9 Q. What is a dose-response curve?

10 A. A dose-response curve is used throughout human biology.
11 It's used to determine the efficacy of pharmaceutical agents.
12 It's used to measure the risk of disease in exposure to varying
13 levels of toxins. So it applies to bacteria. It applies to
14 heavy metal exposures. It applies to cigarette smoke and it
15 applies to the kind of medications that we take to treat human
16 disease. The higher the dose, the more the response and you
17 plot out multiple doses and multiple responses and calculate a
18 dose-response curve.

19 Q. Is there a relationship between the levels of exposure and
20 the probability or incidence of disease?

21 A. Yes, and that's, in fact, why we go through the work of
22 developing dose-response curves. It's also, in epidemiologic
23 studies, used as one of the criteria for satisfying the
24 validity of the hypothesis that you put forward. In other
25 words, if you find that twice as many people come down with a

1 certain range of symptoms when exposed to twice as much of the
2 offending agent and that four times as many people come down
3 with exposure with four times the offending agent, and you can
4 demonstrate that dose-response relationship. It is also used
5 as a tool of determining the truth of the given situation.

6 Q. Doctor, can you tell me, please, what indicator bacteria
7 are?

8 A. Indicator bacteria are fellow travelers with pathogens.
9 They are found in mixed bacterial flora from humans and
10 animals. And they have characteristics that allow them to be
11 tested for more reliably and more easily so that they may be
12 viable and culturable when the pathogens that are traveling
13 with them are dormant, still capable of causing disease, but
14 not easily culturable.

15 Q. If we're interested in whether or not Salmonella is in a
16 material, why don't we just test for Salmonella?

17 A. Salmonella in water systems is difficult to recover
18 because of the phenomenon I just referred to of it being
19 non-culturable, but still viable. There are other bacteria
20 that are important pathogens that may require more difficult
21 and more expensive testing devices. So it's a bit of a
22 tradeoff from a public health perspective between having a
23 reliable, easily cultured, easily quantified bacteria such as
24 Enterococcus or E. coli versus bacteria that have been shown in
25 scientific studies to be present, but not as easily cultured.

1 Q. The same question as to Campylobacter, why don't we just
2 test for it?

3 A. Because Campylobacter, an important human pathogen arising
4 from poultry waste, is similarly very difficult to culture in
5 water, but it remains viable. You'd have to use very expensive
6 and elaborate laboratory testing procedures to do that which
7 would not be practical from a public health surveillance and
8 monitoring perspective.

9 Q. Does the presence of indicator bacteria necessarily mean
10 that there's a risk to human health?

11 A. It means a very high probability of risk in excess, in my
12 opinion, of 99 percent. So it's a very useful and reliable,
13 predictable way of saying whether or not somebody is going to
14 be exposed to a hazard.

15 THE COURT: Doctor, quickly, what's the typical
16 incubation period, if you will, for gastroenteritis? It may
17 vary by bacteria?

18 THE WITNESS: It varies.

19 THE COURT: The state of the bacteria?

20 THE WITNESS: It varies by the species of bacteria, so
21 that Salmonella, E. coli, Enterococci all have slightly
22 different things. And then within a given bacteria, there may
23 be a range, so that one person exposed to the same bug might be
24 sick in three days and somebody else might take ten days to get
25 sick.

1 treated with chemotherapy whose immune systems will not be
2 robust, who will not be able to manage even modest doses of
3 pathogens. We have young children and increasingly more of us
4 are living into an older age where our immune systems again are
5 less robust. And finally, we're in the midst of a global HIV,
6 AIDS pandemic and we have many HIV positive people in the
7 United States who are also immunocompromised. So I think what
8 Dr. DuPont said is really irresponsible from a public health
9 perspective.

10 Q. As a person in public health, Doctor, would you ever
11 consider telling someone whose well is contaminated that if
12 they just keep drinking it long enough, they'll be okay?

13 A. And just tough it out, I think that would be a very
14 dangerous thing to do.

15 Q. And if that person had developed an immunity, would that
16 translate to someone who might be visiting from another city?

17 A. Unfortunately it would not.

18 Q. Doctor, let me invite your attention to State's Exhibit
19 404. Could you tell me, please, if you know what that is?

20 A. This is a summary chart of waterborne bacterial illnesses
21 including the timing and symptoms and is a clearer way of
22 presenting the information than by verbal response to His
23 Honor's inquiry a few minutes ago.

24 Q. Does that have the information the Court was inquiring
25 about as to post contact latency?

1 A. Yes, it does. It shows that for E. coli the latency can
2 range from one to seven days. For Salmonella, it's shorter,
3 one to three days. And for Campylobacter, it's two to five
4 days.

5 Q. Does it also purport to show the reported symptoms caused
6 by each of those pathogens?

7 A. Yes, and the symptoms for all three of these major human
8 pathogens are pathogens to humans, I should say. They are
9 pathogens derived from both animal and human sources, but the
10 symptoms include gastroenteritis, nausea, vomiting, watery
11 and/or bloody diarrhea, abdominal cramping, dehydration, kidney
12 failure in the case of E. coli. And then for Salmonella and
13 Campylobacter, the same basic underlying gastroenteritis
14 symptoms of nausea, vomiting, diarrhea. And significantly the
15 infections can involve organ systems outside of the GI tract.
16 For example, Campylobacter has been implicated in arthritis and
17 in Guillain-Barre syndrome.

18 Q. Now, Dr. Lawrence, based upon your education, expertise
19 and experience and based upon all of the materials that you've
20 reviewed by both the State and the defendants, do you have an
21 opinion as to whether the surface application of poultry waste
22 within the Illinois River Watershed poses an imminent and
23 substantial endangerment to the health or the environment of
24 that watershed?

25 MR. RYAN: Your Honor, I object. There's been no

1 We're outside the scope of his affidavit. And I don't know
2 where this is leading, but it certainly hasn't been revealed.

3 THE COURT: All right. Without going back and
4 reviewing the affidavit at this point, any response?

5 MR. EDMONDSON: Your Honor, I'd be pleased if the
6 witness would answer the question that I asked him that Your
7 Honor overruled the objection on.

8 THE COURT: Very well. The objection is sustained.
9 If you'll reask the question.

10 Q. (By Mr. Edmondson) Dr. Lawrence, do you have an opinion
11 based upon your own knowledge and expertise, based upon the
12 review of the affidavits of the State's experts as to whether
13 the surface application of poultry litter within the Illinois
14 River Watershed poses an imminent and substantial endangerment
15 to public health?

16 A. Yes, I do and I believe it does.

17 Q. And do you hold that opinion to a reasonable degree of
18 medical certainty?

19 A. Yes.

20 Q. Do you have an opinion as to whether a moratorium on the
21 land application of poultry waste would have a remedial effect
22 on that threat to public health?

23 A. Yes, it would not totally eliminate the problem, but it
24 would dramatically reduce the threat.

25 MR. EDMONDSON: Thank you. Pass the witness, Your

1 cancer, was that an epidemiological study?

2 A. Smoking and cancer is a very good example of exactly the
3 kind of case control studies that were used to establish the
4 EPA water guidelines. And not everybody who smokes will get
5 lung cancer, but the overwhelming number of people who have
6 lung cancer will have been smokers. The first three large
7 studies that demonstrated that fact were case control studies
8 of exactly the kind that have been used to develop the
9 indicator bacteria E. coli and Enterococci.

10 Q. There was some discussion about the existence of other
11 impaired streams in Oklahoma and the suggested source of that
12 impairment. Tell me, Doctor, in order to have a public health
13 problem, what besides the impairment would be necessarily
14 present?

15 A. You have to have exposure. So you can have an impairment
16 without human exposure to the contaminated water and you would
17 not see any disease.

18 Q. So would the degree to which the Illinois River Watershed
19 is used for recreational activities be important to that
20 connection?

21 A. That's a critically important piece of this entire case.

22 Q. And, Doctor, you testified in Cross-Examination that --
23 about passive reporting only revealing, I think you said fewer
24 than one out of a hundred actual cases?

25 A. Yes.

1 Q. Why is that?

2 A. We know that most people, when they come down with the
3 symptoms of gastroenteritis, will attribute it to the most
4 recent experience they've had. So if I develop nausea and
5 vomiting this evening, I would be more likely to attribute it
6 to something I ate yesterday rather than to having been
7 swimming five days ago.

8 Q. For it to be a reported case at all, what would be
9 necessary?

10 A. The person would have to be sufficiently ill, that usually
11 it's his spouse would say you've got to see your doctor. And
12 then if the doctor would treat empirically and would not take a
13 stool culture, would probably not even question the patient
14 about where they might have been exposed, perhaps beyond saying
15 is anybody else in the family sick. Only then, if the patient
16 persisted and did not respond to empirical therapy or got
17 worse, might the doctor either consult with an infectious
18 disease specialist like Dr. DuPont or to obtain a stool
19 specimen and send it to the hospital laboratory to find out
20 what organism is responsible for the illness.

21 Q. So do some of those reports come from laboratories?

22 A. Yes.

23 Q. Okay. So if the reported cases reflect the one out of a
24 hundred, then if there were six cases reported of Salmonellosis
25 in Adair County in 2007, that would reflect 600 actual

1 illnesses?

2 A. That's a very reasonable extrapolation, yes.

3 Q. And if there were ten reported cases of Salmonello --
4 whatever that word is, in 2007 in Cherokee County, that would
5 reflect a thousand actual illnesses?

6 A. A thousand highly probable illnesses.

7 Q. And as to Campylobacteriosis in Adair County, if there
8 were six reported cases, that would reflect 600 actual
9 illnesses?

10 A. Most likely, yes.

11 Q. And if there were six reported cases in Cherokee, that
12 would reflect another 600?

13 A. Yes.

14 MR. EDMONDSON: That's all, Your Honor.

15 MR. BULLOCK: Just a second.

16 THE COURT: Yes, sir.

17 Q. (By Mr. Edmondson) Doctor, in answer to a question on
18 cross-examination, you started to explain why the distribution
19 of cattle manure is important and time and space. Could you
20 please amplify on that?

21 A. Yes, if you have cattle on a grass fed pasture situation
22 and they're out on pasture 365 days a year, they're moving
23 about the pasture, looking for grass that hasn't been grazed,
24 defecating in a relatively uniform manner across the pasture at
25 a consistent rate over 365 days, that is a very different